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IS 435 (1973): castor oil [FAD 13: Oils and Oilseeds]

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Indian Standard

SPECIFICATION FOR CASTOR OIL

(Second Revision)

Fifth Reprint JULY 2007
(Including Amendment Nos. 1, 2, 3 & 4)

UDC 665.335.5

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *December* 1973

Indian Standard
SPECIFICATION FOR CASTOR OIL
(Second Revision)

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AMENDMENT NO. 1 DECEMBER 1979
TO
IS : 435 - 1973 SPECIFICATION FOR CASTOR OIL

(Second Revision)

Alterations

(*Page* 4, *clause* 4.2) — Substitute the following for the existing clause:

4.2 Clarity — The material of the medicinal grade, firsts special grade and firsts grade shall pass the clarity test. For this purpose, the method as given in Appendix A shall be followed. The material, when tested as prescribed in Appendix A, shall conform to the turbidity values given below:

Grade	*Turbidity in Terms of Silica Scale Units, Max*
Medicinal	3
Firsts special	10
Firsts	30

(*Pages* 4 *and* 5, *clauses* 4.2.1 *and* 4.2.2) — Delete.

(*Page* 7, *Appendix* A, *title*) — Substitute the following for the existing title:

'APPENDIX A

(*Clause* 4.2)

DETERMINATION OF TURBIDITY ON SILICA SCALE'

(CAFDC 5)

AMENDMENT NO. 2 DECEMBER 1989
TO
IS : 435 - 1973 SPECIFICATION FOR CASTOR OIL

(Second Revision)

(*Page* 5, *clause* **5.2**) — Add the following new clause after **5.2**:

'**5.2.1** The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer, BIS marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers, or producers may be obtained from the Bureau of Indian Standards.

(CAFDC 5)

AMENDMENT NO. 3 AUGUST 1995
TO
IS 435 : 1973 SPECIFICATION FOR CASTOR OIL

(Second Revision)

(*Page* 3, *Foreword, clause* **0.2**) — Add the following clause **0.3** after clause **0.2** and renumber the subsequent clause:

'**0.3** A scheme for labelling environment friendly products to be known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests (MEF). The ECO Mark shall be administered by the Bureau of Indian Standards (BIS) under the BIS Act, 1986 as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR 85(E) dated 21 February 1991. For a product to be eligible for marking with the ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environment friendly (EF) requirements. The EF requirements for linseed oil, raw and refined are therefore being included through an amendment.

This amendment is based on the Gazette Notification No. 678 dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.'

(*Page* 5, *clause* **4.3**) — Add the following clauses after clause **4.3**:

'**4.4 Optional Requirements for ECO Mark**

4.4.1 *General Requirements*

4.4.1.1 The product shall conform to the requirements of quality prescribed under clauses **4.1** to **4.3**.

4.4.1.2 The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the *Water (Prevention and Control of Pollution) Act*, 1974; *Air (Prevention and Control of Pollution) Act*, 1981; *Water (Prevention and Control of Pollution) Cess Act*, 1977, respectively, along with the authorization, if required under the *Environment (Protection) Act*, 1986, while applying for ECO Mark.

4.4.2 *Specific Requirements*

4.4.2.1 The product shall not contain aflatoxin, more than 5 mg/kg, when tested by the method prescribed in Appendix D.

4.4.2.2 The pesticide residues, if any, shall not exceed the tolerance limits as prescribed in the *Prevention of Food Adulteration Act,* 1954 and *Rules* made thereunder.

4.4.2.3 Only permitted antioxidants not exceeding the quantities specified against each as prescribed under the *Prevention of Food Adulteration Act,* 1954 and *Rules* made thereunder, shall be used, if required.

4.4.2.4 The product shall not contain any of the toxic metals in excess of the quantities prescribed in Table 2.

TABLE 2 LIMITS FOR TOXIC METALS

SL NO.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
i)	Lead, mg/kg, *Max*	5.0	15 of IS 1699 : 1995*
ii)	Arsenic, mg/kg, *Max*	0.5	do
iii)	Cadmium, mg/kg, *Max*	1.0	do
iv)	Mercury (total) mg/kg, *Max*	0.25	do

* Methods of sampling and test for food colours (*second revision*).

(*Page* 5, *clause* **5.1.2**) — Add the following clause **5.1.3** after clause **5.1.2**:

'**5.1.3** For ECO Mark the product shall be packed in such packages which are made from recyclable (that is which can be re-processed to manufacture any useful product) or biodegradable materials.'

(*Page* 5, *clause* **5.2**) — Add the following clause **5.2.1** after clause **5.2**:

"**5.2.1** For ECO Mark the containers shall be marked with the following information:

a) List of identified critical ingredients in descending order of quantity, percent by mass, which shall include 'made from castor oil';

b) The brief criteria for which the product has been labelled for ECO Mark; and

c) Shelf life of the product."

(*Page* 8, *clause* C.3.1) — Add the following Appendix D after clause C-3.1:

'APPENDIX D

(*Clause* 4.5.2.1)

DETERMINATION OF AFLATOXIN

D-1 REAGENTS

D-1.1 Acetone, 70 Percent — 700 ml acetone in 300 ml distilled water.

D-1.2 Acetone, 20 Percent — 200 ml acetone in 800 ml distilled water.

D-1.3 Lead Acetate, 20 Percent — 200 g neutral acetate in distilled water and 3 ml glacial acetic acid, diluted to one litre.

D-2 PROCEDURE

D-2.1 Dissolve 30 g sample in 100 ml hexane.

D-2.2 Extract with 3 × 50 ml 70 percent acetone.

D-2.3 To the extract add 60 ml distilled water and 20 ml lead acetate.

D-2.4 Boil to reduce volume to 150 ml. Cool to about 20°C.

D-2.5 Filter and wash with 20 percent acetone.

D-2.6 Extract filtrate and washings with 3 × 50 ml chloroform.

D-2.7 Pass chloroform layer through anhydrous sodium sulphate.

D-2.8 Concentrate to 50 ml and spot on TLC plate.

D-3 CALCULATION

$$\text{Aflatoxin, mg/kg} = \frac{V \times s \times 1\,000}{v \times m}$$

where

V = volume of extract in ml,

v = volume of extract giving minimum observable fluorescence in µl,

m = mass of sample in g, and

s = standard toxin giving minimum observable fluorescence in µg.'

(FAD 44)

AMENDMENT NO. 4 MARCH 2002
TO
IS 435 : 1973 SPECIFICATION FOR CASTOR OIL

(Second Revision)

(*Amendment No.* 3, *page* 2, *clause* **4.4.2.1**)— Substitute '5 µg/kg' *for* '5 mg/kg '

(FAD 44)

Indian Standard
SPECIFICATION FOR CASTOR OIL
(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 17 August 1973, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

0.2 This standard was first published in 1954 and subsequently revised in 1966. An Amendment No. 1 to the first revision was issued in November 1969 in order to bring the medicinal grade castor oil in line with the requirements of the pharmaceutical grade prescribed in the Indian Pharmacopoeia. Later, some more comments had been received and their consideration has led to second revision of this standard. In this revision the requirement for ash content has been deleted as it was considered not to serve any purpose. Furthermore the limits for the moisture and volatile matter content of the medicinal grade of castor oil have been raised in view of the actual experience. The physical description of firsts and commercial grades have also been modified.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for castor oil.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given under 2 of IS:548-1964† shall apply.

---

*Rules for rounding off numerical values (*revised*).

†Methods of sampling and test for oils and fats (*revised*).

3. GRADES

3.1 The material shall be of four grades, namely:

a) *Medicinal* — intended for medicinal purposes and for the manufacture of hydraulic brake fluids;

b) *Firsts Special* — intended for use in cosmetic and lubricants;

c) *Firsts* — intended for use in lubricants; and

d) *Commercial* — intended for other industrial uses, such as paints, sulphated oils, soaps and printing inks.

4. REQUIREMENTS

4.1 Description

4.1.1 *Medicinal Grade* — The material shall be the genuine cold drawn, refined product of castor seed (*Ricinus communis* Linn., fam. Euphorbiaceae). It shall be free from admixture with other oils or substances, and also free from sediment and suspended matter. The material shall be practically odourless or have a mild odour characteristic of castor oil.

4.1.2 *Firsts Special Grade* — The material shall be the genuine refined product of castor seed (*Ricinus communis* Linn., fam. Euphorbiaceae). It shall be free from admixture with other oils or substances, and also free from sediment and suspended matter.

4.1.3 *Firsts and Commercial Grades* — The material shall be the genuine product of castor seed (*Ricinus communis* Linn., Fam. Euphorbiaceae). It shall be free from admixture with other oils or substances, and also practically free from sediment and suspended matter.

4.2 Clarity — The material of the medicinal grade, firsts special grade and firsts grade shall pass the clarity test. Two alternative methods, the 'Bourgeois print method' and the 'silica scale turbidity' method have been prescribed for determination of clarity; in case of dispute the Bourgeois print method shall be adopted.

4.2.1 *Bourgeois Print Method* — The height of the column of the material through which Bourgeois print may be read in a 100-ml Nessler tube shall be as follows:

Grade	*Height of Column*, mm, *Min*
Medicinal	100
Firsts special	100
Firsts	50

4.2.2 *Silica Scale Turbidity Method* — The method as given in Appendix A shall be followed. The material, when tested as prescribed in Appendix A, shall conform to the turbidity values given below:

Grade	*Turbidity in Terms of Silica Scale Units, Max*
Medicinal	3
Firsts special	10
Firsts	30

4.3 The material shall also comply with the requirements given in Table 1.

5. PACKING AND MARKING

5.1 Packing

5.1.1 The material shall be packed in containers in quantities as agreed to between the purchaser and the supplier.

5.1.2 The material shall be packed in suitable, well-closed containers as agreed to between the purchaser and the supplier.

5.2 Marking — Each container shall be marked with the following:

a) Name and grade of the material;
b) Name of the manufacturer or trade-mark, if any;
c) Contents of the material in the container; and
d) Date of manufacture.

6. SAMPLING AND CRITERIA FOR CONFORMITY

6.1 For the purpose of ascertaining the conformity of the material in a consignment to this specification, the procedure for drawing the samples, the scale of sampling and the criteria for conformity shall be as prescribed in **3** of IS : 548-1964*.

7. TEST METHODS

7.1 Tests shall be carried out as prescribed in appendices to this standard and the methods prescribed in IS : 548-1964*. References to the appendices to this standard and the relevant clauses of IS : 548-1964* are given in col 7 and 8 of Table 1, respectively.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960†) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

---

*Methods of sampling and test for oils and fats (*revised*).

†Specification for water, distilled quality (*revised*).

TABLE 1 REQUIREMENTS FOR CASTOR OIL

(*Clause* 4.3)

Sl No.	Characteristic	Requirement for Grade				Method of Test, Ref to	
		Medicinal	Firsts Special	Firsts	Commercial	Appendix	Cl No. of IS : 548-1964*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Colour in a 1-in cell on the Lovibond scale in terms of (Y + 5R) units, *Max*	3·5	4·0	30	40	—	13
ii)	Relative density at 30°C/30°C	← 0·954 to 0·960 →				—	11
iii)	Refractive index† at 40°C	← 1·470 0 to 1·474 0 →				—	10
iv)	Critical solution temperature, *Max*	0°C	0°C	—	—	B	—
v)	Acid value, *Max*	2·0	2·0	4·0	6·0	—	7
vi)	Saponification value	← 177 to 185 →				—	15
vii)	Unsaponifiable matter, percent by mass, *Max*	0·8	0·8	1·0	1·0	—	8
viii)	Acetyl value, *Min*	← 143·0 →				—	16
ix)	Iodine value (Wijs)	← 82 to 90 →				—	14
x)	Moisture and volatiles, percent by mass, *Max*	0·25	0·25	0·75	1·00	—	5.1 and 5.2
xi)	Optical rotation at 25°C, *Min*	+ 3·5	—	—	—	C	—

*Methods of sampling and test for oils and fats (*revised*).

†To convert this value to the value at 27°C, add 0·005.

APPENDIX A

(*Clause* 4.2.2)

DETERMINATION OF TURBIDITY ON SILICA SCALE

A-1. TERMINOLOGY

A-1.1 For the purpose of this test, the following definition shall apply.

A-1.1.1 *Silica Scale Unit* — Turbidity imparted by 1 mg of fullers' earth when suspended in 1 000 ml of distilled water.

A-2. PREPARATION OF TURBIDITY STANDARDS

A-2.1 Mix slowly with constant stirring 5·000 g of fullers' earth, previously dried and sieved through 75-micron IS Sieve (*see* IS : 460-1962*), with distilled water and dilute it to 1 000 ml. Agitate intermittently for one hour and then allow to stand for 24 hours. Withdraw the supernatant liquid without disturbing the sediment. Evaporate about 50 ml of the removed liquid, dry the residue at 105 ± 2°C and weigh the residue to determine the amount of clay in suspension. Prepare turbidity standards with this standardized stock suspension with distilled water. A drop of saturated mercuric chloride solution may be added as preservative. The standards are stable for 3 months.

A-3. PROCEDURE

A-3.1 Pour the sample after thorough shaking into a clear glass bottle of suitable capacity, say, one litre. Compare it with the turbidity standards contained in similar bottles, holding them against a suitable background and using a source of light which illuminates them equally and is placed so that no rays reach the eye directly. The sample and the standards shall be shaken simultaneously immediately before comparison.

A-3.1.1 *Report* — Record the turbidity readings in the range 1 to 10 to the nearest unit and in the range 11 to 100 to the nearest 5 units.

APPENDIX B

[*Table* 1, *Item* (iv)]

DETERMINATION OF CRITICAL SOLUTION TEMPERATURE

B-1. REAGENT

B-1.1 The reagent shall be prepared by diluting ethyl alcohol (conforming to IS : 321-1964†) or rectified spirit (conforming to IS : 323-1959‡) with distilled water till the relative density of the mixture at 15·5°C is 0·8303 ± 0·0001, when compared with distilled water at the same temperature. Denatured alcohol shall not be used for this test.

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*Specification for test sieves (*revised*).

†Specification for absolute alcohol (*revised*).

‡Specification for rectified spirit (*revised*).

B-2. PROCEDURE

B-2.1 Mix in a test tube 1·0 g of the material with 4·15 times its mass of the reagent. On examination the solution thus obtained shall be perfectly clear at 20°C and shall remain clear when cooled and maintained for 5 minutes at a temperature of 0°C.

APPENDIX C

[*Table* 1, *Item* (xi)]

DETERMINATION OF OPTICAL ROTATION

C-1. OUTLINE OF THE METHOD

C-1.1 For the purpose of this determination, the optical rotation is taken as the angle in degrees through which the plane of polarization is turned when plane-polarized sodium light is passed through a layer of oil, 100 mm in thickness.

C-2. PROCEDURE

C-2.1 Carry out the determination in a dark room, using monochromatic sodium light. Any recognized type of polarimeter may be used. As far as possible, make the determination using 100-mm tubes. The temperature for determination shall be 25 ± 2°C.

C-2.2 Take at least three readings which should agree to within 0·08 deg.

C-3. EXPRESSION OF RESULT

C-3.1 Round off the average of the three readings to the first decimal place and express it as the optical rotation.

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